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D. M. CHURCHILL, Director and Government Botanist

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A NEW SPECIES OF ORCHIDACEAE FROM VICTORIA

by

DAVID L. JONES*

***Pterostylis aestiva* sp. nov.**

ex affinitate *Pterostylis decurvae* R. S. Rogers, differt: floris colore (saturate aeruginoso), floris basi perbulbosa, antherae rostro prominenti (ca. 1mm. longo), labello longiore (14.5–19.0mm.) atque columna longiore (14–16mm.).

Plant very slender, 12–35 cm tall. *Radical leaves* absent during anthesis, appearing as a rosette on non-flowering plants. *Stem-bracts* 1–3, well developed, up to 4 cm long, linear-lanceolate with long acuminate tips, the margins entire and often revolute. *Flower* solitary, rarely two, variable in size, translucent-white with dark bluish-green longitudinal stripes, often reddish towards apex. *Galea* 22–27 mm long (measured in a straight line from the base of the flower to the petal tips), erect at base, then curving forward through a semi-circle and ending in a filiform point 10–16 mm long. *Lateral sepals* 40–52 mm long, conjoined for three-quarters of their length to form an erect lower lip which is euneate and notched at the centre of upper margins, the latter internally revolute and forming a wide very gibbous sinus, contracting suddenly into filiform points which rise 25–40 mm above the galea. *Labellum* 14.5–19 mm long, linear-oblong, on an irritable claw, upright for two-thirds of its length then curving forwards, reddish brown in colour, with a longitudinal ridge running along the centre and expanding at the tip; apex obtuse, the point protruding conspicuously through the sinus and in some specimens still visible when retracted into the galea; appendage relatively large, curved, trifid, penicillate. *Column* 14–16 mm long, the upper angle of the wings produced into an acute linear tooth about 1.5 mm long, the lower lobes attenuated, slender, almost linear-obtuse with very few cilia visible from the exterior but densely packed on the inner margins. *Stigma* central, elliptical, 7–10 mm long. *Anther* about 2.5 mm long, usually with a small rostrum about 0.1 mm long. *Pollinia* four, linear-oblong, about 1.8 mm long.

FLOWERING TIME :

January—early April.

DISTRIBUTION :

At present apparently restricted to Victoria where it is confined to the highlands of the north-east and is often locally abundant. Its appearance in the highlands and tablelands of southern New South

* Bayswater, Victoria.



Fig. 50—*Pterostylis aestiva* D. L. Jones sp. nov. a, b flowering specimens, $\times 2/3$; c juvenile rosette of leaves, $\times 2/3$; d, e flowers from front, $\times 2/3$; f column and labellum, from side, $\times 2$; g labellum from above, flattened, $\times 2$; h lower lobe of column wing, $\times 3\frac{1}{3}$; i lateral petal, $\times 1$; j pollinia, $\times 3\frac{1}{3}$, all specimens from Mount Hamilton.

Wales and the Australian Capital Territory is to be anticipated, with a possible extension into Tasmania.

TYPEFICTION :

Holotype—About 6 miles directly NNW. of Wulgulmerang Post Office, NE. Gippsland, Victoria, A. C. Beaglehole 35911, 8.i.1971 (MEL—Isotypes in K and NSW).

REPRESENTATIVE COLLECTIONS :

[Grid references given below refer to those that have been selected for the mapping scheme for the flora of Victoria now being undertaken jointly by Monash University and the National Herbarium of Victoria.]

Little River area, Benambra road, about 8 miles NNW. of Wulgulmerang Post Office, A. C. Beaglehole 33274, 7.i.1970 [Grid V53]; Wombargo Track Turnoff, Benambra road, about 6 miles NNW. of Wulgulmerang Post Office, (Holotype), A. C. Beaglehole 35911, 8.i.1971 [Grid W8]; Sailors' Lake, about 2 miles SW. of Wulgulmerang Post Office, A. C. Beaglehole & K. C. Rogers (ACB 36077), 13.i.1971 [Grid W8]; upper reaches of Milky Creek, Rocky Range Wildlife Reserve, about 5 miles NE. of Wulgulmerang Post Office, A. C. Beaglehole & K. C. Rogers (ACB 36103), 14.i.1971 [Grid W8]; upper reaches of Milky Creek, Rocky Range road, about 5 miles NE. of Wulgulmerang Post Office, A. C. Beaglehole & K. C. Rogers (ACB 36106), 14.i.1971 [Grid W9]; Little Mount Hamilton, about 6 miles NNE. of Wulgulmerang Post Office, A. C. Beaglehole & K. C. Rogers (ACB 36173), 17.i.1971 [Grid V53]; Boundary Creek, Gelantipy road, about 2½ miles SSW. of Wulgulmerang Post Office, A. C. Beaglehole 36724, 10.ii.1971 [Grid W8]; Ensay-Bentleys Plains road, about 7 miles NE. of Ensay South, about 24 miles SW. of Wulgulmerang Post Office, A. C. Beaglehole 37013, 23.ii.1971 [Grid W15]; Joker Gully, Benambra road, about 6 miles NNE. of Wulgulmerang Post Office, A. C. Beaglehole & K. C. Rogers (ACB 37264), 7.iii.1971 [Grid V53]; Devils Backbone, near Campbells Knob, about 9 miles SE. of Wulgulmerang Post Office, A. C. Beaglehole 37281, 8.iii.1971 [Grids W17, W18]; between Tulach Ard property and Tulach Ard Gorge on Snowy River, about 14 miles SSE. of Wulgulmerang Post Office, A. C. Beaglehole 37297, 9.iii.1971 [Grid W17]; southern foot of Mount Hamilton, Snowy River road, about 5½ miles NNE. of Wulgulmerang Post Office, A. C. Beaglehole & K. C. Rogers, (ACB 37398), 13.iii.1971 [Grid W8]; near Mt. Meenak, Suggan Buggan Ranges, D. L. Jones & K. C. Rogers, 1.iv.1972 [Grid V54.]

DISCUSSION :

The distinctiveness of this orchid was first recognized by A. C. Beaglehole during his plant survey of East Gippsland for the Victorian National Parks Authority. The author received specimens from him during 1970 (ACB 33274) but at the time referred them to a form of *P. decurva* R. S. Rogers. However, Beaglehole made further widespread collections during the bountiful 1971 season and examined many colonies representing both pure and mixed populations, and during these studies he became convinced that two species of *Pterostylis* were involved in the area. Even after examining a good selection of specimens, the author was doubtful at first about its status, and con-

sidered that *P. aestiva* might have been a highland development of *P. decurva*. However, after studying and measuring many specimens collected by Beaglehole, and examining colonies in the field at Wulgulmerang, the author was convinced that it was worthy of specific rank. The two species do not always grow together, but where they are coextensive *P. aestiva* can be recognized easily by its larger, bluish-green, inflated flower. Specimens can be readily identified by the much longer labellum; in some specimens this is so long that it still protrudes from the sinus when in the reflexed position. A comparison of the main features of each is given in Table 1. *P. aestiva* also has affinities with *P. coccinea* R. D. FitzG. This latter species however has a larger, usually reddish flower with a scabrous sinus, and a much longer labellum. Both species grow intermingled on Mounts Hamilton and Little Hamilton in north-eastern Victoria but are easily distinguished from one another. The only other species that could possibly be confused with it is *P. laxa* J. A. P. Blackmore. However, the latter can easily be distinguished from *P. aestiva* by its acuminate labellum and non-gibbous sinus.

TABLE 1
(Contrasting Characters)

<i>P. decurva</i>	<i>P. aestiva</i>
Labellum 11.5-13.0 mm long ..	Labellum 14.5-19.0 mm long but usually about 15.5 mm
Column 11-13 mm long ..	Column 14-16 mm long
Base of flower slightly bulbous or flat, 5 mm across front x 6 mm along side	Base of flower extremely bulbous, 8 mm across front x 9 mm along side
Flower yellowish-green ..	Flower deep bluish-green

ACKNOWLEDGEMENTS

I am greatly indebted to A. C. Beaglehole for his excellent assistance at all times and for the copious material and information which he gave me, especially during the summer of 1971. I also acknowledge the generous help of J. H. Willis, formerly of the National Herbarium of Victoria, for preparing the Latin description as well as editing and criticising the manuscript.

NOTES ON AUSTRALIAN ACACIAS I

by

A. B. COURT*

SUMMARY

Acacia hakeoides A. Cunn. ex Benth. var. *angustifolia* (H. B. Williamson) J. H. Willis is raised to specific rank; *A. hunteriana* N. A. Wakefield is formally relegated to synonymy under *A. boormanii* Maiden, *A. diffusa* Lindl. to synonymy under *A. genistifolia* Link, *A. vomeriformis* A. Cunn. ex Benth. to synonymy under *A. gunnii* Benth. and *A. diptera* to synonymy under *A. wilddenowiana* H. Wendl.; the confusion between *A. brownii* (Poir.) Steud. and *A. pugioniformis* H. Wendl. is resolved and *A. quadrilateralis* DC. brought out of synonymy; the identity of *A. bynoeana* has been established and shown to be an endemic New South Wales species, *A. pumila* Maiden et R. T. Baker is relegated to synonymy under *A. bynoeana* and *A. wilhelmiana* F. Muell. replaces *A. bynoeana* as the correct name applied to South Australian, New South Wales and Victorian material formerly referred to *A. bynoeana*; *A. difformis* R. T. Baker is added to the Victorian flora and *Choretrum oxycladum* F. Muell. is added as a synonym to *A. spinescens* Benth.

NOMENCLATURAL AND TAXONOMIC NOTES

Acacia boormanii Maiden in *J. Roy. Soc. N.S.W.*, 49 : 489 (1916).

SYN.: *Acacia hunteriana* N. A. Wakefield in *Vict. Nat.*, 72 : 92 (1955).

Acacia boormanii is a common species in eastern Victoria and the far south-east of New South Wales and seems to be confined mainly to the Snowy River watershed. The author has examined material collected throughout its range and can find no reason to regard *A. hunteriana* as specifically distinct and accordingly the latter name is relegated to synonymy.

Acacia brownii (Poir.) Steud. *Nom. Bot.* 2 (1821).

SYN.: *Acacia acicularis* R. Br. in Ait. f. *Hort. Kew.* ed. 2 5 : 460 (1813), non Humb. et Bonpl. ex Willd. (1809).

Mimosa Brownei Poir. in *Encycl. Méth. (Bot.) Suppl.* 5 : 530 (1817).

Acacia pugioniformis H. Wendl. in *Flora* 2 : 139 (1819).

Acacia Arceuthos Spreng. *Syst. Veg.* 3 : 134 (1826).

Acacia juniperina (Vent.) Willd. var. *Brownei* (Poir.) Benth. *Flor. Aust.* 2 : 332 (1864).

* National Herbarium of Victoria.

The author in *Vict. Nat.* 73 : 173 (1957) followed G. Bentham's synonymy [*Flor. Aust.* 2 : 332 (1864)] but queried *A. pugioniformis* H. Wendl. (1819). Since then the author has been able to examine all the relevant literature and has established that Wendland published *A. pugioniformis* as a substitute name for *A. acicularis* R. Br. The full synonymy of *A. brownii* is given above together with the corrected author citation and spelling of the epithet. This species is known from only New South Wales and Victoria. In 1820, Wendland published another description of *A. pugioniformis* [*Comment. Acac.* 5, 38 t.9 (1820)] and figured a specimen that he considered represented the same species as Brown's *A. acicularis*. It is quite clear that Wendland had confounded two distinct species, one of which is now known as *A. brownii* and the other hitherto called *A. pugioniformis*. This latter species should now be called *A. quadrilateralis* DC. (See p. 158).

Acacia bynoeana Benth. in *Linnaea* 26 : 614 (1855).

SYN.: *Acacia pumila* Maiden et R. T. Baker in *Proc. Linn. Soc. N.S.W.* Ser. 2 10 : 385 t.28 (1895).

Hitherto the name *Acacia bynoeana* has been applied to a population now known correctly as *A. willhelmiana* F. Muell. and a full discussion of the confusing history of the former name and its relationship to the latter appears later in this paper. The author has compared a fragment of the holotype of *A. bynoeana* with the holotype of *A. pumila* and has no hesitation in asserting that these two names represent the same species. No significant differences of any kind can be found between them and accordingly *A. pumila* is relegated to synonymy under *A. bynoeana*.

The specimen on which Bentham based *A. bynoeana* was gathered by Benjamin Bynoe and it was evidently labelled simply "Australia" with no other data. It is clear now that it must have been collected in the vicinity of Port Jackson by Bynoe during his stay there from 24 July until 11 November 1838.

A. bynoeana is now regarded as an endemic New South Wales species.

Acacia difformis R. T. Baker in *Proc. Linn. Soc. N.S.W.* 22 : 154 t.9 (1897).

This species has been known in Victoria for many years but remained unidentified until several years ago. It is well known to the author who has observed it in several places in north-central Victoria, especially near Wytehitella, north of Bendigo, west of Graytown and south of Benalla. *A. difformis* was wrongly placed in *A. retinodes* Schlechtendal and was known as "Mystery Wattle" in the Bendigo district. It is a species that rarely sets fruit and no fruiting material has been noted in this State. *A. difformis* has been gathered at a number of stations in New South Wales where it often forms extensive thickets, e.g. in the vicinity of Merrygoen. It is confined to New South Wales and Victoria.

Acacia genistifolia Link *Enum. Plant. Hort. Berol.* 2 : 442 (1822).

SYN.: *Acacia diffusa* Lindl. in *Edwards' Bot. Reg.* 8 : t.634 (1822).

Acacia prostrata Lodd. *Bot. Cab.* 7 : t.631 (1822), nomen nudum.

Phyllodoce genistifolia (Link) Link *Handb. Erk.* 2 : 133 (1831).

Acacia cuspidata A. Cunn. ex Benth. in Hook. *Loud. J. Bot.* 1 : 337 (1842), non Schlechtendal (1838).

Acacia cuspidata A. Cunn. ex Benth. var. *longifolia* Benth. in *Linnaea* 26 : 610 (1855).

Acacia diffusa Lindl. var. *cuspidata* (A. Cunn. ex Benth.) Benth. *Flor. Aust.* 2 : 333 (1864).

In *Vict. Nat.* 74 : 12 (1957), the author discussed the fact that three different names were proposed during 1822 for material hitherto referred to *A. diffusa* but refrained from altering its name. The position with regard to these names can be clarified now. *A. prostrata* Lodd. is little more than a nomen nudum and was published during August 1822. *A. genistifolia* Link was published during the first half of that year while *A. diffusa* Lindl., according to the date on the plate, was published on July 1, 1822.

Recently a genuine Link specimen of *A. genistifolia* was located in the Melbourne Herbarium (MEL 39790) and it bears a label that reads "Acacia genistifolia Lk! Original — *A. diffusa* Lindley Hort Bot. reg. Berolin. comm. Museum bot. Berolin. Schumann". This specimen can be taken to be part of the type and leaves no doubt that *A. genistifolia* and *A. diffusa* are conspecific.

Link's specimen represents the typical form of the population of individuals included in that species. Lindley's concept of this species does not represent the typical form as it is understood at present but refers to a more or less flattened phyllode form frequently found in Tasmania. Loddiges' illustration of *A. prostrata* indicates that he had the same variant in mind.

A. genistifolia has been recorded from New South Wales, Victoria and Tasmania.

Acacia gunnii Benth. in Hook. *Loud. J. Bot.* 1 : 332 (1842).

SYN.: *Acacia vomeriformis* A. Cunn. ex Benth. in *l. c.*

Acacia gunnii and *A. vomeriformis* were described simultaneously and maintained as distinct species until 1859 when Mueller [in *J. Linn. Soc. (Bot.)* 3 : 119 (1859)] placed the latter name as a synonym under the former. Although Mueller is here credited with making this decision, it is possible that Bentham who edited Mueller's manuscript was responsible for regarding the two species as conspecific. In a note at the beginning of Mueller's article (*l. c.* 114) Bentham wrote :

"In so far as the specimens have admitted of it, I have, at Dr. Mueller's request, carefully compared his species with those nearly allied to them, and added any remarks which suggested themselves, at the end of his descriptions. In the few cases where I have clearly identified them with others previously described, I have given the published names, adding his manuscript ones for the purpose of reference, and retaining his characters as completing our previous knowledge of the plants."

There is an implication here that Bentham relegated *A. vomeriformis* to a synonym of *A. gunnii* but this is opposed to his treatment of these two names in *Flor. aust.* 2 : 350 (1864) where he considered that *A. gunnii* was a synonym of the former name.

A. gunnii has been recorded from all Australian states excepting Western Australia.

***Acacia quadrilateralis* DC. Prodr. 2 : 451 (1825).**

SYN.: *Acacia pugioniformis* H. Wendl. *Comment. Acac.* 5, 38 t.9 (1820), *pro parte* non H. Wendl. in *Flora* 2 : 139 (1819).

Reference has already been made under *Acacia brownii* (Poir.) Steud. above concerning the confusion that has surrounded the application of *A. pugioniformis* in the past. It is necessary to reject *A. pugioniformis* as a name that can be applied to material hitherto known under that name and replace it with *A. quadrilateralis*. Candolle's name was based on Sieber *Fl. Novae Holl.* No. 442 which is represented by two replicates in the Melbourne Herbarium and it undoubtedly represents the same material as indicated by the erroneous interpretation given to *A. pugioniformis* in the past.

A. quadrilateralis is well-known from Queensland and New South Wales.

***Acacia spinescens* Benth. in Hook. Lond. J. Bot. 1 : 323 (1842).**

SYN.: *Choretrum oxycladum* F. Muell. *Fragm. Phyt. Aust.* 1 : 121 (1858).

When the late H. U. Stauffer of the Botanic Museum of the University of Zurich visited the Melbourne Herbarium in December 1963, he drew the author's attention to the existence the name *Choretrum oxycladum* and indicated that this name should be relegated to synonymy under *Acacia spinescens*. The author agreed fully with this assertion. The holotype of *Choretrum oxycladum*, a specimen collected at Port Lincoln (South Australia) by C. Wilhelmi, is filed in the Melbourne Herbarium (MEL 2308), G. Bentham, *Flor. Aust.* 6 : 218 (1873), was unable to satisfactorily place *Choretrum oxycladum* in any genus and suggested that the flowers "... may all possibly be in a monstrous state. If not, the plant must belong to some very different Order." J. M. Black made no mention of *Choretrum oxycladum* in either edition of his *Flora of South Australia*.

A. spinescens is indigenous to South Australia, New South Wales and Victoria.

Acacia sublanata Benth. in Endl. et al. *Enum. Plant. Hueg.* 42 (1837).

SYN.: *Acacia luehmannii* F. Muell. *Fragm. Phyt. Aust.* 11 : 116 (1881).

G. Bentham cited a Bauer specimen in his original description of *A. sublanata* and gave simply "Australia" as its locality. Later, in *Flor. Aust.* 2 : 378 (1864), he asserted that Robert Brown collected this species along the south coast of Australia but he did not specifically mention Bauer's specimen. At the same time he wrongly relegated *A. pravifolia* F. Muell. to synonymy under *A. sublanata* thus causing confusion which has persisted until the present time. The author has examined the holotype of *A. sublanata* and also two Brown specimens representing the same species in the Kew herbarium. One of Brown's specimens is clearly labelled "Arnheim Bay" and the other "New Holland North Coast" and it seems likely that Bentham misread "North Coast" as "South Coast".

The author has compared an isotype of *A. luehmannii* (a specimen gathered along the Liverpool River by B. Gulliver and filed in the Kew herbarium) with the holotype of *A. sublanata* and has no hesitation in reducing the former name to a synonym of the latter.

A. sublanata has been recorded from Western Australia, Northern Territory and Queensland but *A. pravifolia* is known only from South Australia and New South Wales.

Acacia willhelmiana F. Muell in *Trans. Phil. Soc. Vict.* 1 : 37 (1855).

SYN.: *Acacia Bynoeana* sens. Benth. *Flor. Aust.* 2 : 337 (1864) atque auctt. cum subseq., non quoad Benth. (1855).

Acacia leptophylla F. Muell. *Fragm. Phyt. Aust.* 4 : 9 (1863).

Acacia calanifolia Sweet ex Lindl. var. *willhelmiana* (F. Muell.) Benth. *Flor. Aust.* 2 : 339 (1864)—ut var. *Willhelmsiana*.

Acacia Bynoeana Benth. var. *latifolia* J. M. Black *Flor. S. Aust.* ed. 2 2 : 418 f.576 (1948), *anglice*.

For more than a century uncertainty has surrounded the identity of an *Acacia* common to parts of South Australia, New South Wales and Victoria and hitherto called *A. bynoeana* Benth. Some of this confusion has been due to incorrect data on labels accompanying specimens transmitted to Bentham by Mueller, and it is the author's intention to review this situation and present an account of all pertinent literature (much of which is rare and generally unavailable to botanists) together with comments on the original specimens cited in Bentham's and Mueller's descriptions.

A. bynoeana was originally described by Bentham in *Linnaea* 26 : 614 (1855) from material collected by Benjamin Bynoe who was Surgeon on the *Beagle* during Commander J. Lort Stokes' expedition

to Australia (1837-43) for the purpose of exploring those parts of the coast that remained unknown to Flinders and King. The following is Bentham's description :—

"*A. Bynoeana*, ramulis pubescentibus, phyllodiis breviter subulatis lineari-teretibus subcompressive sulcato-trinerviis uncinato-mucronatis, pedunculis capitulo parvo sub-20-floro longioribus, calyce anguste 5-lobo, petalis angustis.—Fruticulus dense foliatus. Stipulae lanceolatae v. setaceae, lineam fere longae, caducae. Phyllodia pleraque fere pollicaria, conspicue trinervia, mucrone recurvo tenui. Pedunculi hispiduli 3-4 lin. longi. Capitula $1\frac{1}{2}$ lin. diametro. Bracteolae lineares, acuminatae, hispidulae. Petala distincta, lineari-subulata, calycem breviter superantia. Ovarium glabrum. (In Australia tropica? Bynoe in herb. Hooker.)"

Bynoe's specimen carries no indication that it was collected in the Australian tropics (the label says simply "Australia Bynoe"), Bentham evidently added "tropica?" of his own accord. Notes on the actual station at which this specimen was gathered are provided in the discussion under *A. bynoeana* on page 156.

In 1855, Mueller described specimens that he gathered in the Murray scrub under the name *A. wilhelmiana* in the following words :—

"13. *Acacia Wilhelmiana*.

"Viscidulous; stems angular, puberulous; phyllodia incurved, upright, short linear-filiform, compressed, ending in a broader blunt recurved apex, above or on both sides furrowed and furnished with two thin veins; stipules ovate, acuminate, very glutinous, deciduous or at length spinescent; peduncles axillary, solitary, shorter than the flower-heads; pods viscid, narrow, arcuate, between the seeds slightly contracted.

"In the Mallee Scrub on the Murray, where it was first discovered by Mr. Wilhelmi.

"Allied to *Acacia Hookeri*."

This diagnosis, with slight alterations to wording, was republished in *Hook. J. Bot. Kew Gdns Misc.* 8 : 46 (1856). Hooker, who probably edited Mueller's article, added two footnotes, the first against *Acacia wilhelmiana* reading "Is a variety of *A. nematophylla*, F. Muell. (Benth. in *Linnaea*)" and the second against *A. hookeri* reading "Is *A. ericaefolia*, Benth."

In the same year (1855), Bentham took up Mueller's name *A. nematophylla* and published it with a good description in *Linnaea* 26 : 612. This name is a synonym of *A. calamifolia* Sweet ex Lindl. However, at the end of his description Bentham adds :—"Ejusdem var. ramulis minus angulatis, phyllodiisque gummi resinoso seatentibus legit F. Müll. in Murray-Serub. (*A. Wilhelmsiana* F. Müll.)" The specimens referred to here represent the same species described as *A. wilhelmiana* by F. Mueller in the same year and quoted in full above.

Mueller, in *J. Linn. Soc. (Bot.)* 3 : 123 (1859), discussed both *A. nematophylla* and *A. wilhelmiana*;—

"25. *Acacia nematophylla*, Ferd. Muell. ex Benth. in *Linnaea*, xxvi. p.612.

"Spencer's Gulf, *C. Wilhelmi*.

"*Legumina* pluripollicaria, circiter 3''' lata, coriacea corrugata, denum fusciscentia, satis compressa, ad suturas flexuosa. *Semina* atra opaca ovata v. oblongo-ovata satis compressa strophio crasso fulvido fere cymbiformi 1''' longitudine excedente suffulta.

"*Acacia Wilhelmiana**, a cl. Benthani, l. c., cum *A. nematophylla* conjuncta mihi satis singularis videtur visciditate, phyllodiis brevioribus obtusioribus et leguminibus multo minoribus vix $1\frac{1}{2}$ ''' latis. Ceterum vidi nulla hujus speciei exemplaria nisi imperfecta.

"*Frutex* orgyalis satis amplius.

"Specimina cujusdam *Acaciae* ad sinum Spencer's Gulf a C. Wilhelmi collecta, phyllodiis *A. calamifoliae* simillima legumine compresso (etsi magis recto et vix flexuoso) ad *A. nematophyllam* accedens, aut hujus format varietatem insignem aut potius speciem propriam phyllodiis longioribus acutioribus, legumine fere characeo et stropholiis angustioribus singularem."

Mueller [*Plant. Indig. Colon. Vict.* 2 : 12 (1863)] makes the following interesting observations :—

"*A. Wilhelmiana* (F. M. in *Transact. Phil. Soc. Victor.* i. 37, and in Hook. Kew Miscell. viii. 46), from the vicinity of Port Lincoln, hitherto seen only in a fragmentary state, appears to be a variety of *A. calamifolia*, characterized by shorter less pointed somewhat gummoso viscid and very slightly downy phyllodia, short-silky peduncles, more coherent sepals and smaller arcuate pods. Certain narrow-phyllodinous states of *A. montana*, as well as a species gathered on the Gulf of Carpentaria during A. Gregory's Expedition, exhibit a strong habitual resemblance to *A. Wilhelmiana*; whilst again some states of *A. linifolia* are externally by no means dissimilar to varieties of *A. calamifolia*."

In 1863, Mueller described another new species called *A. leptophylla* (*Fragm. Phyt. Aust.* 4 : 9) from material that he thought he had collected in the Gulf of Carpentaria himself. This is the material referred to in the above description.

Benthani, *Flor. Aust.* 2 : 337 (1864), amplified his description of *A. bynoeana* and included in his description characters drawn from specimens Mueller called *A. leptophylla*. Benthani also provided the following notes under its distribution :—"N. Australia. N. W. coast, Bynoe; Gulf of Carpentaria, F. Mueller. The latter are the specimens alluded to by F. Mueller, Pl. Viet. ii. 12, as nearly *A. Wilhelmsiana*. The corresponding ones, both in Herb. Hooker and in Herb. Sonder, were, by some mistake, labelled as *A. Wilhelmsiana* from the Murray scrub, and were mentioned by me in *Linnaea*, xxvi. 613, as a var. of *A. nematophylla*, F. Muell. The latter is, however, a short-leaved form of *A. calamifolia*, which has never more than 1 nerve on each side of the phyllodium". Later, l. c. 339, Benthani reduced *A. wilhelmiana* to a variety of *A. calamifolia* and added the following comment :—"Under the name of *A. nematophylla*, F. Muell., I had, in *Linnaea*, xxvi. 612 (owing partly to a wrong label originally sent with F. Mueller's specimens), confounded this variety with the northern *A. Bynoeana*, which is at once known by the venation of the phyllodia."

In his great monograph on the Suborder *Mimoseae* published in *Trans. Linn. Soc. Lond.* 30 : 456 (1875), Benthani continued to maintain that *A. bynoeana* was a tropical Australian species and retained *A. leptophylla* as a synonym of it. On page 457 of the same work, he still maintained that *A. wilhelmiana* was a synonym of *A. calamifolia*. He also added *A. nematophylla*, ex parte, as an additional synonym of that name.

Evidently Mueller never admitted *A. bynoeana* to the floras of south-eastern Australia as reference to his *Systematic Census of Australian Plants* (1882), *Key to Victorian Plants* (1888) and *Second Systematic Census of Australian Plants* (1889) show. It seems obvious that he concluded Bentham was correct in assigning *A. willhelmiana* to synonymy under *A. calamifolia*.

Maiden in *J. Roy. Soc. N.S.W.* 49 : 501-2 (1916) noted that *A. bynoeana* had been recorded for north-west Australia and from the Gulf of Carpentaria but added South Australia, New South Wales and Victoria as additional localities on the basis of specimens gathered by St. Eloy D'Alton, Walter Gill, P. E. Lewis and F. E. Haviland. Undoubtedly Maiden's conclusions were accepted without question by J. M. Black in his *Flora of South Australia* and by H. B. Williamson who wrote up the *Leguminosae* for A. J. Ewart's *Flora of Victoria*.

Both *A. bynoeana* (as *A. pumila*) and *A. willhelmiana* (as *A. bynoeana*) have been adequately described in modern treatments of *Acacia*, the former by key characters [Beadle et al. *Handb. Vasc. Plant. Sydney Distr. Blue Mount.* 222-224 (1962)] and the latter by description and illustration [J. M. Black *Flor. S. Aust.* ed. 2 418 t.576 (1948)] and therefore these species will not be described here.

Acacia willdenowiana H. L. Wendland in *Verzeichniss von Treib-Glashaus-Bosquet-Pflanzen, Stauden-Gewächsen und Georginen, welche im Königlichen Berggarten zu Herrenhausen bei Hannover für beigesetzte Preise zu haben sind.* Hannover. 5 (1845).

SYN.: *Acacia diptera* Lindl. in *Edwards' Bot. Reg.* 23 : Swan Riv. Append. xv (1839), non Humb. et Bonpl. ex Willd. (1809).

Acacia diptera Lindl. var. *erioptera* Benth. in Hook. Lond. J. Bot. 1 : 325 (1842).

Acacia diptera Lindl. var. *erioptera* R. Graham in *Curtis's Bot. Mag.* 68 : t.3939 (1842).

Acacia diptera Lindl. var. *angustior* Meisn. in *Lehm. Plant. Preiss.* 1 : 5 (1842).

Acacia diptera Lindl. var. *latior* Meisn. in *l. c.* 4.

Acacia diptera Lindl. var. *eriocarpa* W. V. Fitzg. in *J. W. Aust. Nat. Hist. Soc.* 1 : 44 (1904).

Acacia willdenowiana H. Wendl. must replace *A. diptera* Lindl. as the name for a well-known Western Australian species recorded from the south-west regions of that State. The confusion that surrounded the application of Wendland's name for many years started when B. Seemann drew attention to the existence of *A. willdenowiana* on page 72 of *Verhandlungen der k. k. Gartenbaugesellschaft in Wien im Jahre 1846* where he erroneously relegated it to synonymy under *A. diptera* Humb. et Bonpl. ex Willd. Seemann later [*Europ. Eingef. Acac.*

9] changed his mind and placed *A. wilddenowiana* under *A. diptera* Lindl. as a synonym and, at the same time, asserted (*l. c.* 66) that *A. diptera* Humb. et Bonpl. ex Willd. was a synonym of *Prosopis juliflora* (Sw.) DC, a native of the Americas. G. Bentham, *Flor. Aust.* 2 : 321 (1864), followed Seemann's latter assertion and repeated it again in *Trans. Linn. Soc. Lond.* 35 : 447 (1875).

Through the courtesy of Professor G. Wagenitz of the Systematic-Geobotanical Institute of the University of Göttingen, the author has been able to examine Wendland's original publication where his notes appear as a footnote to *A. diptera* Humb. et Bonpl. ex Willd. Because of the extreme rarity of this publication, these notes are now quoted in full :—

"Diese Acacia diptera Humb. et Bonpl. in Willdenow's Enumeratio Plantarum horti botanici Berolinensis 1809 Pars II. pag. 1051, deren Vaterland in America meridionali angegehen ist und zur Abtheilung Foliis conjugato-pinnatis gehört, darf nicht verwechselt werden mit der Acacia diptera Lindl. Bot. Reg. 1839, welche am Swan River wächst und nach Meissner in Plantae Preissianae pag. 4. zur Abtheilung II. Alatae gehört. Ich erlaube mir daher diese letztere als Acacia Willdenowiana H. Wendl. zu bezeichnen."

***Acacia williamsonii* A. B. Court comb. nov.**

SYN.: *Acacia ligulata* A. Cunn. ex Benth. var. *angustifolia* H. B. Williamson in A. J. Ewart *Flor. Vict.* 594 (1931).

Acacia hakeoides A. Cunn. ex Benth. var. *angustifolia* (H. B. Williamson) J. H. Willis in *Vict. Nat.* 73 : 156 (1957).

Acacia williamsonii is undoubtedly a distinct species almost entirely confined to the Whipstick scrub near Bendigo in the north-central region of the State. It is characterized by its small narrow phyllodes (less than 3 mm wide), small distinctly moniliform pods (less than 4 mm wide), and small flower-heads with fewer than 30 flowers. *A. hakeoides* has phyllodes always wider than 3 mm, pods which are hardly constricted between the seeds and certainly wider than 4 mm, and rather large flower-heads with more than 30 flowers. *A. williamsonii* is known locally as Whirrakee Wattle and is endemic to this State.

ACKNOWLEDGMENTS

The author expresses his appreciation of the kind assistance given to him by the directors and staffs of the Kew Herbarium and the National Herbarium of New South Wales and the Keeper and staff of the Department of Botany, British Museum, and also the Chief Librarian of the State Library of Victoria. Drs H. J. Eichler and L. A. S. Johnson secured data relevant to obscure descriptions and the author extends his thanks to them. Professor G. Wagenitz of Göttingen kindly provided valuable information on the whereabouts of H. L. Wendland's original description of *Acacia wilddenowiana*. The author also gratefully acknowledges comments concerning *Choretrum oxycladum* passed onto him by the late H. U. Stauffer of Zurich.

NOTES ON TWO SPECIES OF *CENCHRUS* (GRAMINEAE) IN AUSTRALIA

by

J. D. TWENTYMAN*

SUMMARY

The genus *Cenchrus* comprises about 21 species of grasses extending from tropical to temperate regions in both hemispheres. Many species are regarded as pestiferous weeds because of the spiny burrs enclosing their spikelets; others have been sown as forage grasses. Within Australia seven species are currently recorded as naturalized, and there are two native members of the genus.

METHODS

The identification of the introduced weeds *C. incertus* M. A. Curtis (*C. pauciflorus* Benth.) and *C. longispinus* (Haek.) Fern., has often been confused both in Australian and overseas literature. In this study an attempt has been made to distinguish between these species and to determine their distribution in Australia. Field collections were made during 1970 and 1971, and specimens from the Botanic Museum and Herbarium, Brisbane (BR1), National Herbarium of Victoria, Melbourne (MEL), National Herbarium of New South Wales, Sydney (NSW), and the Western Australian Herbarium, Perth (PERTH) were examined. Descriptions have been compiled from the author's observations on the Australian populations of the species. Spine number was counted under 10 magnification and all spines, irrespective of size, were included in the count. Measurements of floral parts were made on the upper spikelet within each burr. This spikelet is larger than the rest and tends to occupy a central position.

KEY TO THE SPECIES

Spine number usually <40, florets <5.8mm long *C. incertus*
Spine number usually >40, florets >5.8mm long *C. longispinus*

DESCRIPTIONS OF THE TWO SPECIES

Cenchrus incertus M. A. Curtis in *Boston J. Nat. Hist.* 1 :135 (1837).

C. pauciflorus Benth. *Bot. Voy. H.M.S. Sulphur* 56 (1844).

Plants annual or overwintering; *culms* ascending or erect from a decumbent base, freely branching, up to 100cm tall; *ligule* ciliate, 0.6–1.9mm long; *leaves* spreading, keeled, up to 18cm long and 2–6mm wide; *inflorescence* compact, 2–6cm long and 0.5–1.5cm wide including spines; *burrs* ovoid to globose with short to medium pubescence, 2.5–8mm wide excluding spines; *peduncle* glabrous or

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shortly pubescent, 0.7–3mm long; *spines* (including bristles) 11–43, spreading and flat, 2–5.6mm long and 0.5–2.5mm wide; *spikelets* 1 to 4 per burr, 4.3–5.8mm long (rarely up to 6mm long) and 1.3–2.8mm wide; *outer glume* 1-nerved, 1–3.8mm long; *inner glume* 3 to 7-nerved, 2.8–4.9mm long; *sterile lemma and palea* 3.5–5.4mm long; *fertile floret* 4.4–5.9mm long and 1.4–2.3mm wide; *fruit* 1.2–3mm long, 0.5–2.1mm wide.



Fig. 51—Top, *Cenchrus incertus*, Freebairn, 4.ii.1970; centre, *C. incertus*, BRI 092029; bottom, *C. longispinus*, from Meringur, Victoria.

Chase (1920) separated *C. pauciflorus* from *C. incertus* by the taller culms, erect or ascending growth form, and the perennial habit of the latter species. DeLisle (1963) found that it was difficult to separate these two species, and included *C. pauciflorus* as a synonym under the earlier name *C. incertus* but his treatment was rejected by Caro and Sanchez (1967), mainly because of the annual habit of *C. pauciflorus* and the perennial habit of *C. incertus*.

Australian plants from this taxa have in the past been referred to *C. pauciflorus*, but an exception to this treatment was two identical sheets from Bega (New South Wales) held in the National Herbarium

of New South Wales. These plants are robust with taller and more erect culms than other collections from that State. However in experiments conducted by the author on *C. longispinus*, culm length and habit were dependent on the day-length under which the plants were grown (unpublished data). The ability of this species to overwinter also depends on the environment in which the plants are growing. The author feels these characters may not be very useful taxonomically and accepts DeLisle's treatment of *C. incertus* because it is the most thorough study that has been made up to date. On the other hand it is recognised that specimens of *C. incertus* from different regions show considerable variation in burr shape and depth of clefts, spine number and spine width as well as the degree of pigmentation of the burrs and spines. *C. incertus* is aptly described by DeLisle as "a highly variable taxa with a wide geographic range".

DISTRIBUTION :

Southern U.S.A., Mexico, Central and South America, also introduced into South Africa. *Cenchrus incertus* has been introduced to New South Wales, particularly northern slopes and plains, and in south-east Queensland; on sandy and sandy-loam soils.

SPECIMENS EXAMINED :

WESTERN AUSTRALIA—Shenton Park, K. Ryan, 8.v.1956 (PERTH); South Bunbury, H. Moore, ii.1927 (PERTH).

QUEENSLAND—Noondoo Siding, Dirranbandi, H. Stone, 20.xi.1961 (BR1 031029); Bungunya, C. Hayes, i.1947 (BR1); Miles, H. B. Ford, date? (BR1 018269); Chinchilla, J. P. Ryan, 17.xii.1958 (BR1 013462); Chinchilla, J. P. Ryan, 3.i.1961 (BR1 026366); Chinchilla, W. Cutmore, 11.i.1962 (BR1 037859); Tara, S. Lester, ii.1956 (BR1); Tara, R. J. Haddock, 3.ii.1964 (BR1 048248); Kapunn, Tara Line, Henry Cunningham, xii.1937 (BR1); Kapunn, via Dalby, J. P. Ulemm, x.1960 (BR1); Broadwater Road, 2 miles east of Moonie Highway, L. Wilson, 11.iv.1960 (BR1 025639); Broadwater, W. Bott, 27.i.1970 (BR1 092029); Cecil Plains, W. H. Beckett, 1.iii.1940 (BR1); Cecil Plains, J. E. Barker, 3.iii.1953 (BR1); Cecil Plains, R. W. Wilson, 12.vi.1957 (BR1); Cecil Plains, W. Bott, 19.i.1970 (BR1 092028); Southbrook, J. H. Stower, xii.1958 (BR1 018100); Pittsworth, D. Stapleton, iv.1956 (BR1); Cambooya, H. Y. Partridge, xi.1946 (BR1); Millmerran, H. Hodges, 1.ii.1950 (BR1); Millmerran, A. Bliss, 25.iii.1955 (BR1); Millmerran, E. B. Winston, 31.iii.1960 (BR1 025697); Talgai West Estate, Allora Shire, Coll?, 1930 (BR1); Inglewood, E. W. Baird, 15.i.1953 (BR1); Ellangowan, M. R. Stevenson, 5.iv.1963 (BR1 037680).

NEW SOUTH WALES—Murray River, near Barbara, G. A. Crawford, 8.v.1950 (NSW 120903); Tullibigeal, J. Scott, 21.iii.1969 (NSW 124732); Narrandera, H. M. Ware, 3.xii.1956 (NSW 120909); Narrandera, R. H. Done, 6.i.1970 (MEL); Yetman, E. G. Jacobs, 17.ii.1949 (NSW); Warialda, per Glenfield Vet. Res. Station, 13.ii.1940 (NSW); Warialda, T. Forans, 10.xii.1935 (NSW); Warialda, A. Johnson, 26.ii.1951 (NSW); Narrabri, Rigg, 6.xii.1921 (NSW 120905); Bohena Creek, J. L. Sutherland, 15.xi.1939 (NSW 120904); Bohena Creek, H. G. Kelso, 12.xii.1970 (MEL); Baan Baan, Anderson & Co., 19.v.1939 (NSW); Boggabri, E. L. Ryder, 22.ii.1943 (NSW); Gunnedah, Shire Clerk, v.1925 (NSW 120899); Tamworth, W. B. Harding, 5.i.1951 (NSW 120898); 12 miles east of Coonabarabran, R. D. Freebairn, 4.ii.1970 (MEL); Rylstone, P. H. Koschemakin & Co., 12.i.1968 (NSW 98528); Newcastle, S. Millington, 22.i.1970 (NSW 120901); Glen Davis, K. Green, 6.ii.1956 (NSW); Bega District, K. Flemons, v.1954 (NSW 120895).

***Cenchrus longispinus* (Hack.) Fern. in *Rhodora* 45 : 388 (1943).**

Plants annual, rarely overwintering; *culms* ascending from a decumbent base, freely branching, up to 55cm tall; *ligule* ciliate, 0.5–2.2mm long; *leaves* spreading, sometimes keeled, up to 19cm long and 2.8–6.8mm wide; *inflorescence* compact, 2.5–8cm long and 1–2cm wide including spines; *burrs* ovoid to globose, short to medium pubescent, 3.1–6.6mm wide excluding spines; *peduncle* shortly pubescent, 0.8–3.0mm long; *spines* numerous, slender, often purple, basal spines and bristles spreading or recurved, upper spines spreading, 2.7–6.8mm long and 0.7–1.5mm wide; *spikelets* sessile, 1 to 3 (4) per burr, 6–7.2mm long and 1.9–2.8mm wide; *outer glume* 1-nerved, 1.9–3.4mm long; *inner glume* 4 to 7-nerved, 4.2–5.8mm long; *sterile lemma and palea* 3.7–6.6mm long; *fertile floret* 5.9–7.5mm long, 1.5–4.6mm wide; *fruit* 2.1–3.2mm long, 1.3–2.3mm wide.

Until the beginning of this century *C. longispinus* had been incorrectly identified as *C. tribuloides* L. 'The first Australian collection in 1895 from Colac, Victoria was under this name'. However, Hitchcock (1908) showed that the Linnaean species was a coastal plant with large densely pubescent burrs, and since that time *C. longispinus* has been usually included in *C. paniciflorus*. DeLisle (1963) separated *C. longispinus* from *C. incertus* by the length of florets and the number of spines on the burr and the author has no difficulty distinguishing between these two species. Several specimens of *C. longispinus* examined had burrs with few spines (as low as 30), but they could be easily separated from *C. incertus* by their longer spikelets and florets. Other morphological characters which can be used are the broader leaves and culms, and the longer, narrower spines in *C. longispinus*. These characters are highly variable however, and show considerable overlap between the species.

DISTRIBUTION :

Native to eastern and central U.S.A. from where it has spread to western and northern U.S.A., central America, and south-east Canada. It has been introduced into Australia where it is a common weed on sandy soils in South Australia, Victoria, and New South Wales.

SPECIMENS EXAMINED :

WESTERN AUSTRALIA—Boscabel, *A. A. Norrish*, 5.ii.1929 (PERTH) ; South Caroling, *A. K. Thompson*, 11.i.1924 (PERTH).

SOUTH AUSTRALIA—Yamda, *J. D. Twentyman*, 25.ii.1970 (MEL.) ; Blanchtown, *P. Kloot*, 5.iii.1970 (MEL.) ; Dorrien, *P. Kloot*, 5.iii.1970 (MEL.) ; 6 miles north-east of Adelaide, *P. Kloot*, 23.ii.1970, (MEL.).

QUEENSLAND—Murgon, *Berlin & Davidson*, i.1941 (BRI).

NEW SOUTH WALES—shore of Lake Menindie, south-east of Broken Hill, C. M. Piggitt, 31.i.1971 (MEL); Dareton, D. L. W. Henderson, 27.iv.1954, (NSW); Wakool Shire (Moulamein), Shire Clerk, 19.ii.1963 (NSW); Nevertire, A. H. Robards, 8.ii.1944 (NSW); Tharbogang, near Griffith, G. R. Sainty, i.1966 (NSW); Griffith district, T. S. Butt, 21.ii.1945 (NSW); Griffith district, D. E. Wallin, 11.i.1956 (NSW); Murray River, 14 miles west of Corowa, G. C. Bartlett, 25.vi.1938 (NSW); Woolbrook, J. W. Boyle, 24.iii.1950 (NSW 120900); on roadside from Coonabarabran to Timor Rock, H. Salasoo 2201, 4.i.1962 (NSW 120896); Coonabarabran, per Glenfield Vet. Res. Station, 13.v.1938 (NSW 120897); Orange, W. J. Hudson, 17.iii.1954 (NSW 120910); Armatree, J. Hodgson, 21.xii.1929 (NSW); Binnaway, B. Hoet, iv.1948 (NSW); Gilgandra, R. Harris, 23.vi.1938 (NSW); Gilgandra, C. R. Horwood, 14.ii.1941 (NSW); Gilgandra Shire, J. B. Sword, 6.xii.1948 (NSW 120908); Cobbera Shire (Guirrie), Shire Clerk, 10.vi.1938 (NSW); Dubbo, per Glenfield Vet. Res. Station, 13.i.1937 (NSW 120906); Dubbo, per Glenfield Vet. Res. Station, 2.iii.1938 (NSW 120907); Dubbo, N. S. Tincker, 3.iii.1959 (NSW); Glenridding, D. McLeod, 7.xii.1937 (NSW 120902); Mudgee district, Shire Clerk, 5.vi.1936 (NSW); Manildra district, H. H. T. Shirwin, iii.1922 (NSW); Forbes district, Shire Clerk, xi.1936 (NSW); Forbes, G. Charles, 9.xii.1958 (NSW); Kelso, G. Ray, iv.1922 (NSW 120911); Gundagai, S. Wilson, iii.1923 (NSW).

VICTORIA—Sunny Cliffs, J. D. Twentyman, 24.ii.1970 (MEL); Meringur, J. D. Twentyman, 24.ii.1970 (MEL); Red Cliffs, Gwyneth Claringbull, 1937 (MEL); Red Cliffs, E. Ramsay 92, iii.1950 (MEL); Kiamil, north of Ouyen, J. D. Twentyman, 24.ii.1970 (MEL); Nandalay, J. D. Twentyman, 16.ii.1971 (MEL); Noradjuha, Shire of Arapiles, A. Sinclair, date? (MEL); Nagambie, D. McAlpine, 3.i.1901 (MEL); Angustown, G. Cameron, iii.1907 (MEL); Lake Colac, Marriner, 1895 (MEL).

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THE FLORA OF ULUPNA ISLAND RESERVE

by

T. B. MUIR*

INTRODUCTION

Ulupna Island is situated in northern Victoria at approximately 145° 50' east and 35° 50' south, and is bounded by the Murray River and one of its anabranches named Ulupna Creek. The nearest towns include Strathmerton, Echuca, Numurkah, Tocumwal, Cobram and Yarrawonga. The reserve itself lies in the southwestern portion of the island and has an area of about 840 acres. A somewhat smaller area of State Forest adjoins it to the north. Ulupna Island has been allotted the grid reference L 54 in the mapping scheme for the flora of Victoria now being undertaken jointly by Monash University and the National Herbarium of Victoria.

At the National Herbarium there was, until recently, no list of plants for Ulupna Island, nor even for Barmah Forest which adjoins the Murray River not far downstream. Apparently none of the early botanists had collected there, nor had any of the more recent ones. There is also a dearth of published information which is referable to the flora nearby. Leigh and Mulham (1965) discuss only the more common species of an area which includes Ulupna Island. McBarron (1955) lists the plants of a nearby region. J. H. Willis (personal communication) has drawn up a list of plants (unpublished) for Nathalia, about 20 miles away, where the flora is somewhat different. In view of the lack of information which applies to this reserve specifically and in detail, the author has found the listing of plant species for it to be most rewarding.

Apart from extending the range of a number of species, this study has resulted in the discovery of two very uncommon species:—*Brachycome muelleroides* and *B. readeri*. *B. muelleroides* was recorded from Picola, Victoria, in 1930 by J. H. Willis, but it has not been found there since, although it is known from several localities in southern New South Wales. *B. readeri* has been previously recorded only from a few widely scattered localities in Victoria and south-eastern South Australia. Another species worth mentioning is the introduced *Ludwigia palustris*. Aston (1967) has written a note concerning its discovery along the Ovens and Kiewa Rivers. The author discovered it in the Ulupna Island Reserve on 25 October 1967, and subsequently it was found along the Wonnangatta River, and along the Murray River just downstream from the Ovens River confluence.

* National Herbarium of Victoria.

ESTABLISHMENT OF THE RESERVE

The Strathmerton district was first taken up as a pastoral run in 1842 or shortly before. Since that time farming there has become more diversified, with a consequent clearing of the land. Nevertheless some of it towards the Murray River was still under native pasture and carried the original trees until about 1963, when much of this was cleared and ploughed up for wheat. Virtually the only remaining areas of natural vegetation in the district were the State Forest adjoining the Murray River and Crown Land on Ulupna Island. It was generally believed that the latter was State Forest until enquiries were made by a local resident, Mr. W. Stebbing, who realized that it had considerable scenic value and was well worth preserving. As a result of his initial interest a committee was formed in 1966 to investigate the possibility of having this Crown Land reserved. Information on its value was supplied by several organizations and government departments, includ-

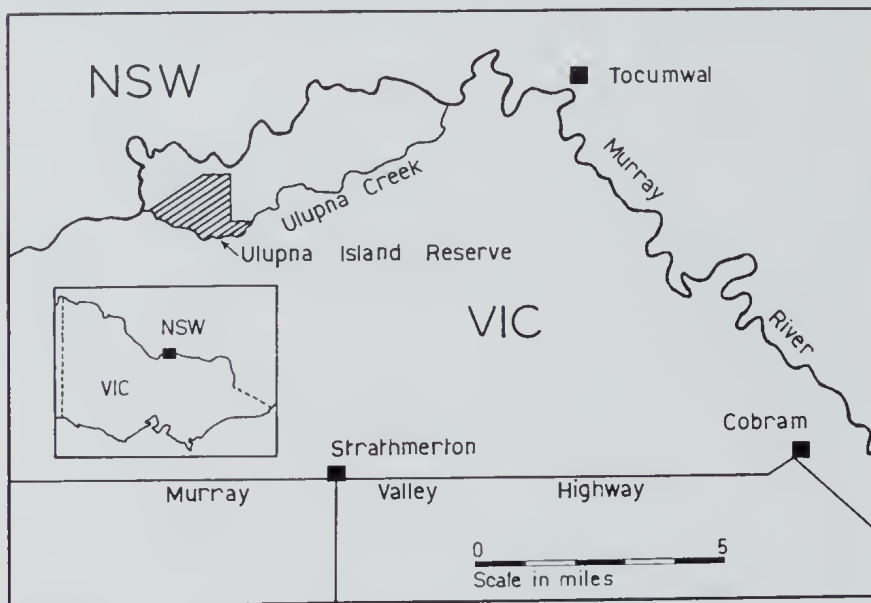


Fig. 52—Location of Ulupna Island Reserve.

ing the National Herbarium which was asked for a list of the plants. The author made several trips to the proposed reserve to study the vegetation and prepare such a list. Subsequently, the land was officially proclaimed a Public Purposes (Preservation of Flora and Fauna) Reserve on 5 August 1969.

CLIMATE AND GEOLOGY

Ulupna Island is part of the flood-plain of the Murray River, and consists of geologically recent alluvial deposits at an altitude of approximately 350 feet above sea-level.

Flooding takes place periodically in Barmah Forest, and less frequently on Ulupna Island, but precise figures have apparently not been published. Ulupna Creek itself is a permanent stream.

The following figures on the climate are approximate since they are based on those for other places in the district. None is available for Ulupna Island itself, but it is unlikely that there will be any marked differences. The average yearly rainfall is approximately 17 inches, with most of this rain falling between June and October. January and February are the hottest months with an average maximum temperature of 88°, and July is the coldest with an average maximum of 56°. The average date of the first and last frosts of 32° is 28 June and 7 August respectively.

VEGETATION

At present a total of 178 species of plants has been listed for the reserve. Of the lower plants, five are lichens and two are mosses, but undoubtedly there are more of these, as well as fungi, to be discovered. Of the flowering plants and ferns, one third are naturalized aliens. *Compositae* is by far the largest family with 35 species, about one third of them being introduced. These unfortunately include some aggressive weeds such as *Carthamus lanatus*, *Cirsium vulgare*, *Chondrilla juncea* and *Hypochaeris glabra*. The *Gramineae* is another large family with 28 species, just over half of them being introduced. In contrast the remaining families are represented by up to six species each.

The reserve is generally flat, with most of the species distributed uniformly over it. There is some slight variation in topography because of a few billabongs and shallow depressions, and a number of shallow water courses which run south-westerly into Ulupna Creek. Water lies in these for a short time periodically. Consequently there is a corresponding slight variation in the distribution of the species.

The trees are the dominant and most attractive feature, and give the area a very pleasant park-like appearance. They are generally well-spaced and the canopy is nowhere closed, although in some places there are dense stands of young trees. There are a few small clearings. *Eucalyptus camaldulensis* is the dominant species. Other trees are few, viz. *E. melliodora* and *E. microcarpa* in the south-eastern section, *Exocarpos cupressiformis*, *Pittosporum phillyreoides*, *Acacia inplexa*, *A. dealbata*, and *Schinus molle*, the only introduced tree. Shrubs likewise are few, but small annuals and herbaceous perennials are abundant.

In the more open places the ground cover is low and the soil can be seen between the plants. Some of the species are perennials which die back to a tuberous root during summer, e.g. *Anguillaria dioica*, *Arthropodium minus*, and *Bulbine bulbosa*. Others have a thick rootstock which enables them to survive the dry summer, e.g. *Convolvulus erubescens*, *Geranium solanderi*, *Rumex brownii*, *R. crystallinus*, *Sida corrugata*, and *Wahlenbergia quadrifida*. Some are ephemerals, e.g.

Goodenia pinnatifida, *Helipterum australe*, *H. corymbiflorum*, *Stuartina muelleri*, and *Wahlenbergia gracilentia*. Other common species are *Alternanthera denticulata*, *Cotula australis*, *Crassula macrantha*, *C. peduncularis*, *C. sieberana*, *Danthonia caespitosa*, *D. setacea*, *Echium lycopsis*, and *Oxalis corniculata*.

Beneath the trees the flora is similar but the plants are further apart, and the soil here is partly covered by litter from the trees.

In the depressions the plants grow densely but only to a height of more or less 12 inches. Species found in the more shallow depressions include *Brachycome muelleroides*, *B. readeri*, *Hordeum hystrix*, and *Marsilia drummondii*. Where water lies well into the spring, *Hypoxis hygrometrica*, *Mimulus gracilis*, and *Utricularia dichotoma* will be found.

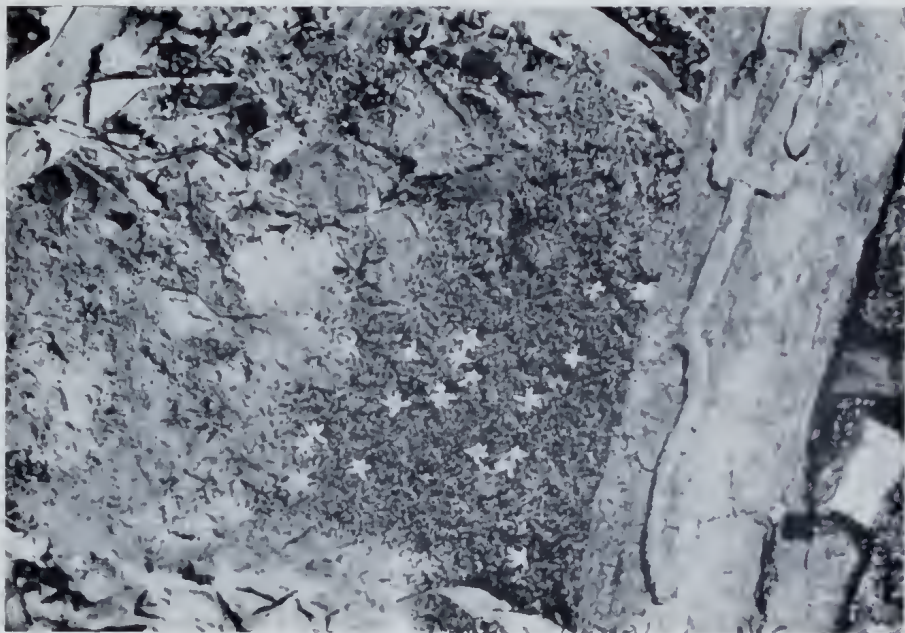
The billabongs hold water all or most of the year, and this enables aquatic and swamp species to survive. Aquatic species found here are *Azolla pinnata*, *Callitriche stagnalis*, *Myriophyllum propinquum*, *Ottelia ovalifolia*, *Potamogeton sulcatus*, *Triglochin procera*, and *Vallisneria spiralis*. *Carex inversa*, *C. tereticaulis*, *Eleocharis acuta*, *E. pusilla*, *Glossostigma elatinoides*, *Isotoma fluviatilis*, *Juncus bufonius*, *Juncus* sp., *Polygonum prostratum*, and *Pratia concolor* grow in the damp soil bordering these billabongs.

Beneath the trees along Ulupna Creek plants grow more rampantly. It is only here that *Acacia dealbata* is found. *Mentha australis* and *M. satureioides* are both common here.

Naturally there is no sharp division between the habitats described, consequently the species mentioned here for any particular habitat, may also be found to a lesser extent in others.

Up to the present the reserve has suffered remarkably little from grazing or from timber-cutting. The number of species of native flowering plants and ferns (118) is very high for this type of country and for such a small area. Introduced species make up one third of the total but there seem to be only two which are a problem. *Echium lycopsis* is fairly widespread, and *Carthamus lanatus*, although common only in the eastern section, could easily become a serious pest. It is to be hoped that every effort will be made to keep this reserve in a good state of preservation, and at the very least prevent the spread of weeds. The native species have virtually disappeared from the plains of central northern Victoria, except for those in a few River Red Gum forests adjoining the Murray River, and some scattered remnants on roadsides and creek banks. The latter have a limited life, mainly because of encroachment of weeds, so the reserve on Ulupna Island is particularly important, not only because of its scenic value but also because it is such a good example of a flora now almost exterminated in Victoria.

With regard to changes which may take place in the flora, two factors will be important—grazing and the regeneration of the River Red Gum. Although grazing has resulted in little damage up to the



Isotoma fluviatilis growing in damp soil beside a billabong.



Typical *Eucalyptus camaldulensis* on Ulupna Island Reserve.

present, it might intensify that damage unless reduced. The Committee of Management hopes to fence an area of perhaps forty acres which will then be protected from stock and rabbits. If this can be done the subsequent changes in the vegetation, especially in the ground flora, would be a guide to future management. It would also be of interest to know the effect of grazing by the Grey Kangaroo and the emu, both of which are native to this area and still present in small numbers. (It is worth mentioning that the koala was also found here in past years). Certainly some grazing seems necessary to prevent excessive growth of vegetation which would become a fire hazard when dry. The River Red Gum is very sensitive to fire and it would be advisable to avoid conditions in which a fire could start. The regeneration of the River Red Gum has been studied in Barmah Forest by Dexter (1967). He has found that grazing by cattle can be an aid in regeneration, as plants which may otherwise compete with the seedling trees are suppressed. On the other hand regulation of the flow of the Murray River has resulted not only in less frequent flooding but also in floods recurring more often in summer, both these changes having an adverse effect on regeneration. It remains to be seen how much these factors will affect the flora of the reserve on Ulupna Island.

ACKNOWLEDGEMENTS

I am most grateful to Mr. W. Stebbing of Katunga, who has taken a keen interest in the flora of the reserve, and who was responsible for finding a number of the uncommon and consequently more interesting species. He has given up much of his time to accompany me on my visits to the island and without his help I could not have listed the plants adequately. I am also grateful to Messrs. R. O'Malley and J. Farrell for information and hospitality.

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FLORA OF ULUPNA ISLAND RESERVE, VICTORIA

(Compiled mainly from identifications made by the author, subsequent to visits on 25 October 1967, 29 October 1968, 7 October 1969, and 28 September 1970, with a few additions from slides or specimens taken by W. Stebbing of Katunga.)

Naturalised aliens are indicated by *

Native species ..	125
Naturalised aliens ..	53

Total 178 at 17 May 1972.

LICHENS

Graphis sp.
Lecanora sp.
Lepraria caudularis (L.) Fries
Physcia sp.
Teloschistes sieberianus (Laur.) Hillm.

MOSES

Tortula princeps (C. Muell.) De Not.
Triquetrella papillata (Hook. f. & Wils.) Broth.

FERNS

Azolla pinnata R. Br.
Marsilea drummondii A. Br.

FLOWERING PLANTS

I. MONOCOTYLEDONS

Pontamogetonaceae

Pontamogeton sulcatus A. Bennett

Juncaginaceae

Triglochin procera R. Br.

Alismataceae

Danthonium minus (R.Br.) Buch.

Hydrocharitaceae

Ottelia ovalifolia (R. Br.) L. C. Rich.
Vallisneria spiralis L.

Gramineae

Agropyron scabrum (Labill.) Pal. Beauv.
Agrostis avenacea J. F. Gmel.
 **Aira caryophylla* L.
Alopecurus geniculatus L.
Amphibromus uesii Steud.
 **Briza minor* L.
 **Bromus mollis* L.
 **B. rubeus* L.
 **B. sterilis* L.
Cynodon dactylon (L.) Pers.
Danthonia caespitosa Gaudich.
D. setacea R. Br.
Deyeuxia quadriseta (Labill.) Benth.
 **Hordium hystrix* Roth
 **H. leporinum* Link
 **Koeleria phleoides* (Vill.) Pers.

- **Lolium loliaceum* (Bory & Chaub.) Hand.-Mazz.
- **L. multiflorum* Lam.
- **L. perenne* L.
- **Phalaris minor* Retz.
- Phragmites communis* Trin.
- **Poa annua* L.
- P. australis* sp. agg.
- Stipa variabilis* D. K. Hughes
- Themeda australis* (R. Br.) Stapf
- **Vulpia bromoides* (L.) S. F. Gray
- **V. megalura* (Nutt.) Rydb.
- **V. myuros* (L.) K. C. Gmel.

Cyperaceae

- Carex inversa* R. Br.
- C. tereticaulis* F. Muell.
- Cyperus exaltatus* Retz.
- Eleocharis acuta* R. Br.
- E. pusilla* R. Br.

Juncaceae

- Juncus bufonius* L.
- J. sp.*, aff. *J. australis* Hook. f.

Liliaceae

- Anguillaria dioica* R. Br.
- Arthropodium minus* R. Br.
- Bulbine bulbosa* (R. Br.) Haw.
- Dianella laevis* R. Br.
- Tricoryne elatior* R. Br.

Hypoxidaceae

- Hypoxis hygrometrica* Labill.

2. DICOTYLEDONS

Santalaceae

- Exocarpos cupressiformis* Labill.
- E. strictus* R. Br.

Loranthaceae

- Amyema miquellii* (Lehm.) Van Tiegh.
- A. pendulum* (Sieber ex Spreng.) Van Tiegh.

Polygonaceae

- **Polygonum aviculare* L.
- P. hydropiper* L.
- P. prostratum* R. Br.
- Rumex brownii* Campd.
- R. crystallinus* Lange

Amaranthaceae

- Alternanthera denticulata* R. Br.

Molluginaceae

- Glinus lotoides* L.

Caryophyllaceae

- **Cerastium glomeratum* Thuill.
- **Petrorhagia velutina* (Gussone) Ball & Heywood

Spergularia rubra (L.) J. & C. Presl

Stellaria caespitosa Hook. f.

**S. media* (L.) Cyrillo

**S. palustris* Ehrh. ex Retz.

Ranunculaceae

**Ranunculus muricatus* L.

R. pumilio R. Br. ex DC. var. *politus* R. Melville

R. rivularis sp. agg.

Cruciferae

**Capsella bursa-pastoris* (L.) Moench

Cardamine sp.

Crassulaceae

Crassula macrantha (Hook. f.) Diels

C. peduncularis (Sm.) Meiger

C. sieberana (Schult. & Schult. f.) Druce

Pittosporaceae

Pittosporum phillyreoides DC.

Rosaceae

**Aphanes arvensis* L.

Mimosaceae

Acacia acinacea Lindl.

A. dealbata Link

A. genistifolia Link

A. implexa Benth.

Papilionaceae

**Medicago polymorpha* L.

Swainsona procumbens (F. Muell.) F. Muell.

**Trifolium arvense* L.

**T. campestre* Schreb.

**T. glomeratum* L.

**T. tomentosum* L.

Geraniaceae

Geranium solanderi R. Carolin

Oxalidaceae

Oxalis corniculata L.

Linaceae

Linum marginale A. Cunn. ex Planch.

Euphorbiaceae

Euphorbia drummondii Boiss.

Callitrichaceae

Callitriche stagnalis Scop.

Anacardiaceae

**Schinus molle* L.

Malvaceae

Sida corrugata Lindl.

Violaceae

Viola betonicifolia Sm.

Menyanthaceae

Nymphoides crenatum (F. Muell.) O. Kuntze

Myrtaceae

Eucalyptus camaldulensis Dehnh.
E. melliodora A. Cunn. ex Schauert
E. microcarpa (Maiden) Maiden

Onagraceae

**Epilobium adenocaulon* Hausskn.
E. cinereum A. Rich.
**Ludwigia palustris* (L.) Ell.
**Oenothera striata* Ledeb.

Haloragaceae

Myriophyllum propinquum A. Cunn.

Umbelliferae

Daucus glochidiatus (Labill.) Fisch. et al.
Eryngium rostratum Cav.
Hydrocotyle sp.

Primulaceae

**Anagallis arvensis* L.

Gentianaceae

**Cicenda quadrangularis* (Domb. ex Lam.) Griseb.

Lythraceae

Lythrum sp.

Convolvulaceae

Convolvulus erubescens Sims
Dichondra repens Forst. & Forst. f.

Boraginaceae

Cynoglossum sp.
**Echium lycopsis* L.
Plagiobothrys elachanthus (F. Muell.) I. M. Johnston

Verbenaceae

**Verbena* sp.

Labiatae

Mentha australis R. Br.
**M. pulegium* L.
M. satereioides R. Br.

Solanaceae

Nicotiana sp.
**Solanum nigrum* L.

Scrophulariaceae

Glossostigma elatinoide (Benth.) Benth. ex Hook. f.
Minulus gracilis R. Br.
**Parentucellia latifolia* (L.) Caruel
Veronica peregrina L.

Lentibulariaceae

Utricularia dichotoma Labill.

Plantaginaceae

- **Plantago coronopus* L.
- P. varia* R. Br.

Rubiaceae

- **Galium murale* (L.) All.

Cucurbitaceae

- **Cucumis myriocarpus* Naudin

Campanulaceae

- Wahlenbergia fluminalis* (J. M. Black) Wimmer ex Hj. Eichler
- W. gracilentia* N. Lothian
- W. quadrifida* (R. Br.) Alph. DC.
- W. sp. aff. W. stricta* Sweet

Lobeliaceae

- Isotoma fluviatilis* (R. Br.) F. Muell. ex Benth.
- Pratia concolor* (R. Br.) Druce

Goodeniaceae

- Goodenia gracilis* R. Br.
- G. pinnatifida* Schlechtendal

Compositae

- **Arctotheca calendula* (L.) Levyns
- Brachycome basaltica* F. Muell. var. *gracilis* Benth.
- B. decipiens* Hook. f.
- B. ? goniocarpa* Sond. & F. Muell.
- B. muelleroides* G. L. Davis
- B. readeri* G. L. Davis
- Calotis hispidula* (F. Muell.) F. Muell.
- **Carduus tenuiflorus* Curt.
- **Carthamus lanatus* L.
- Centipeda cunninghamii* (DC.) A. Br. & Aschers
- C. minima* (L.) A. Br. & Aschers
- **Chondrilla juncea* L.
- **Cirsium vulgare* (Savi) Ten.
- Cotula australis* (Sieber ex Spreng.) Hook. f.
- **C. bipinnata* Thunb.
- Craspedia glauca* (Labill.) Spreng.
- C. globosa* (Bauer ex Benth.) Benth.
- Cymbonotus lawsonianus* Gaud.
- Eclipta playglossa* F. Muell.
- Gnaphalium indutum* Hook. f.
- G. involucratum* Forst. f.
- G. luteo-album* L.
- G. purpureum* L.
- **Hedypnois cretica* (L.) Willd.
- Helipterum albicans* (A. Cunn.) DC.
- H. australe* (A. Gray) Druce
- H. corymbiflorum* Schlechtendal
- **Hypochaeris glabra* L.
- Leptorhynchus squamatus* (Labill.) Lessing
- Myriocephalus rhizocephalus* (DC.) Benth.
- Senecio quadridentatus* Labill.
- Solenogyne bellioides* Cass. var. *gunnii* (Hook. f.) G. L. Davis
- **Sonchus asper* (L.) Hill
- **S. oleraceus* L.
- Vittadinia cuneata* DC.

STUDIES IN AUSTRALIAN LICHENS II.†

The Alpine Lichen *Thamnolia vermicularis* (Sw.) Shaer. in Australia

by

REX B. FILSON*

Thamnolia, which has a world wide distribution in alpine and sub-alpine habitats was first collected in Australia by Baron Ferdinand von Mueller on the Cobboras Mountains in early February 1854 during his 2,500 mile epic journey around the State of Victoria. The range of this lichen is very limited and it grows only in the sub-alpine areas of Southern New South Wales, North-eastern Victoria and Central and South-eastern Tasmania. It occurs on most mainland peaks above 5,600 feet, where it favours *Poa* tussock grassland. In Tasmania the

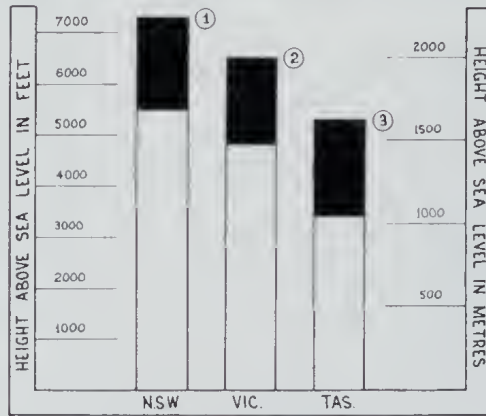


Fig. 53—Altitudinal range (in black) of *Thamnolia vermicularis* in Australia. 1. Mount Kosciusko 7,314 feet (2,293m) 2. Mount Bogong 6,509 feet (1,984m) 3. Mount Ossa 5,305 feet (1,617m).

distribution is limited further as it does not appear to grow in the wilderness areas of the South-west. It is absent from the Hartz Mountains area, Mount Solitary, Frankland Range and the Ranges to the south. The most southerly record is on the Mount Wellington Range to the west of Hobart. Figure 53 illustrates the altitudinal range for each of these three States.

There has been much discussion in recent papers on the validity of Chemical 'species', some authors considering different chemo-types to be specific, whilst others prefer to refer to them as chemical strains.

† Studies in Australian Lichens I, *Victorian Naturalist* 87:324-27 (1970).

* National Herbarium of Victoria.

Thamnolia, once thought to be monotypic, has been subdivided into two distinct species on the basis of chemistry. *Thamnolia vermicularis* (Sw.) Schaer. contains thamnolic acid and *Thamnolia subuliformis* (Ehrh.) W.Culb. contains squamatic acid and bacomycic acid. These two 'species' are easily distinguished by testing the UV reaction (Sato 1963). The present author prefers to consider these two entities merely as chemical strains and in this paper will refer to them as 'chemical strain *vermicularis*' or UV —, and 'chemical strain *subuliformis*' or UV +.

There appears to be no significant macroscopic difference between these two taxa, Dr. G. C. Bratt (in litt.) suggests that the medulla is thicker in the UV + specimens, but the author has found thin medulla in UV + samples as well as thick medulla in UV —.

Sato (1965), in a paper entitled *The Mixture ratio of the Lichen Genus Thamnolia in New Zealand*, shows that the percentage of UV + specimens found in Australia is ca.17%. He also states that this is consistent with the world wide distribution of the genus. It must be pointed out that 'chemical strain *vermicularis*' grows profusely in its limited habitats on the Australian mainland, colonies sometimes attaining several square metres in area. Whilst the author has examined large quantities of this lichen under UV radiation, no plus specimens have been located. 'Chemical strain *subuliformis*' on the other hand occurs in three isolated localities in Tasmania. In these localities it is not plentiful, occurring only in single strands or in a small tuft here and there. 'Chemical strain *vermicularis*' has been found in association with it at these localities and occurs independently in numerous other areas. It seems evident that the percentage of UV + specimens in Tasmania is far lower than twenty-five (Sato, 1968: 328) and certainly much lower than seventeen per cent. for the whole of Australia.

Thamnolia vermicularis (Sw.) Schaer. *Enumer. Critic. Lich. Europ.* 243 (1850).

Thallus variable, sometimes fruticose, in dense clumps up to 15 cm. tall, sometimes in single strands lying on the substrate, greyish-white in the upper part, pinkish in the lower, sometimes simple, tapering upwards to a fine point, sometimes irregularly branched, sometimes uniform in thickness, 1.5–2.0 mm diam., sometimes swollen in the upper parts to as great as 5 mm. *Cortex* up to 30 μ thick. *Algal layer* up to 60 μ thick, discontinuous, of cells 12–15 μ diam. *Medulla* compact, horny, up to 300 μ thick, hyphae longitudinally arranged 2–2.5 μ thick. *Inner surface* ecorticate.

Apothecia not seen.

REACTIONS:

'Chemical strain *vermicularis*'—K + deep yellow, P + yellow becoming orange. UV — or faintly + on the inside of the thallus tube.

'Chemical strain *subuliformis*'—K + pale yellow, P + yellow becoming deep yellow-gold. UV + intense white.

SPECIMENS EXAMINED :

NEW SOUTH WALES—Mount Gingera, Brindabella Range, *Rex Filson* 11442, 13.i.1970 (MEL 1010917) ; Snowy Mountains (MEL 9375) ; Snowy Mountains, *W. Bauerlin* 143, March 1890 (MEL 9381) ; Summit of Mount Jagungal, Snowy Mountains, *Rex Filson* 10209, 16.iii.1967 (MEL 19704) ; on the spur between the main and northwest peaks of Mount Jagungal, Snowy Mountains, *Rex Filson* 10201, 16.iii.1967 (MEL 19719) ; Charlot's Pass on the Kosciusko road 24 miles south of Jindabyne, *Rex Filson* 7907, 2.xii.1965 (MEL 19691) ; Charlot's Pass, to the north of the Kosciusko road, Kosciusko State Park, *Rex Filson* 11498, 15.i.1970 (MEL 1010916) ; on the south-western slopes of Mount Twynam, Kosciusko State Park, *Rex Filson* 10133, 14.iii.1967 (MEL 19718) ;



Fig. 54—The known distribution of *Thamnolia vermicularis* in Australia.

North-western side of Mount Northcote, Kosciusko State Park, *Rex Filson* 10091, 11.iii.1967 (MEL 19702); Mount Kosciusko, *W. Bauerlin* (MEL 9377); eastern side of the Crackenback Range, Snowy Mountains, *Rex Filson* 10018, 11.iii.1967 (MEL 19701); Mount Gungarten, Snowy Mountains, *Rex Filson* 10235, 18.iii.1967 (MEL 19703); on outcrop of rock to the east of Rawson's Pass, Kosciusko State Park, *Rex Filson* 11525, 15.i.1970 (MEL 1010920); slopes below ridge of Ramshead Range just east of Spencer Creek Crossing between Perisher Valley and Charlott's Pass, Kosciusko State Park, *W. A. Weber and D. McVean*, University of Colorado Exsiccati 226, 4.i.1967 (MEL 32468); The Pilot, *Rex Filson* 9948, 20.ii.1967 (MEL 19684).

VICTORIA—Mount Nelse, Bogong High Plains, *Rex Filson* 8123-8128, 20.i.1966 (MEL 19673, 19676, 19677, 19692, 19693, 19695); "Helipterum Hill" south of Mount Nelse, Bogong High Plains, *A. C. Beaglehole* 15677, 27.i.1966 (MEL 27864); Mount Buffalo, *P. Bibby*, 25.i.1946 (MEL 20231); Basalt Hill, Bogong High Plains, *A. C. Beaglehole*, 29.i.1967 (MEL 18754, 19474); head of Middle Creek on the south side of Basalt Hill, Bogong High Plains, *J. H. Willis*, 17.i.1947 (MEL 19674); Basalt Hill, Bogong High Plains, *Rex Filson* 9496, 22.i.1967 (MEL 19681); Cobboras, *Ferd. Mueller*, 1854 (MEL 9380); Cobboras Mountains, *J. H. Willis*, 10.ii.1946 (MEL 25968); Summit of the Cobboras, *N. A. Wakefield*, 29.i.1949 (MEL 19679); on the northern granite lumps of the Cobboras, *Rex Filson* 9998, 21.ii.1967 (MEL 19682); Mount Feathertop, *J. R. Tovey* (MEL 9379); 50 feet below the summit of Mount Feathertop, on the eastern side in the vicinity of Hellfire Gully, *Rex Filson* 9864, 17.ii.1967 (MEL 19683); Twin Knobs on the Razorback between Feathertop and Hotham, *Rex Filson* 9894, 18.ii.1967 (MEL 19685); Razorback, between Mount Hotham and Mount Feathertop, *J. H. Willis*, 13.ii.1966 (MEL 19687); Mount McKay, Bogong High Plains, *Rex Filson* 9654, 27.i.1967 (MEL 19686); Mount Cope, Bogong High Plains, *Rex Filson* 8093, 19.i.1966 (MEL 19694); Mount Cope, Bogong High Plains, *A. C. Beaglehole* 15566, 26.i.1966 (MEL 27840); The Peak, north end of Mount Wombargo, *Rex Filson* 8271-8274, 5.iii.1966 (MEL 19688, 19689, 19690, 19696); Wombargo Peak, above Little River, *J. H. Willis*, 4.xii.1962 (MEL 19678); Mount Higgenbotham, *Rex Filson* 9792, 16.ii.1967 (MEL 19672); northern end of the Cross Cut Saw, *Rex Filson* 9705, 14.ii.1967 (MEL 19680); steep face of "Gable Ends", Mount Wellington, *Stella M. Fawcett*, 3.ii.1940 (MEL 9376); along the ridge ca.3 miles south of Mount Darling, which is ca.11 miles south-east of Mount Howitt on the Main Divide, *Rex Filson* 12252, 6.iii.1971 (MEL 1010921).

TASMANIA (UV —)—Mount Barrow, North-east, *G. C. Bratt* 3135, 30.i.1966 (G.C.B.)*; Hanson's Peak, North-west, *B. C. Bratt* 67/536, 8.xii.1967 (G.C.B.); Summit of Hanson's Peak, Cradle Mountain-Lake St. Clair National Park, *Rex Filson* 10701, 24.ii.1968 (MEL 1000000); summit of Mount Campbell, Cradle Mountain-Lake St. Clair National Park, *Rex Filson* 10833 & *Sue Filson*, 1.iii.1968 (MEL 1010914); on the Plateau between Barn Bluff and Cradle Mountain above Crater Cirque, *Rex Filson* 10791, 27.ii.1968 (MEL 1010912); rocky escarpment to the east of Hounslow Heath, Cradle Mountain-Lake St. Clair National Park, *Rex Filson* 10861 & *Sue Filson*, 2.iii.1968 (MEL 1010913); summit of The Acropolis, Cradle Mountain-Lake St. Clair National Park, *Rex Filson* 6938, 7.i.1965 (MEL 19675); on the plateau along the Mount Field West Track, Mount Field National Park, *Rex Filson* 10627 & *Sue Filson*, 20.ii.1968 (MEL 1010918); Mount Field West, Southern District, *G. C. Bratt* 3605, 10.xii.1966 (G.C.B.); Mount Field West, Mount Field National Park, *Rex Filson* 10608 & *Sue Filson*, 20.ii.1968 (MEL 1010919); Mount Mawson, Southern-central, *G. C. Bratt* 2938, 4.xii.1965 (G.C.B.); Mount Mawson, Mount Field National Park, *Rex Filson* 10586 & *Sue Filson*, 19.ii.1968 (MEL 1010915); tarn shelf near Mount Mawson, Southern-central, *G. C. Bratt* 67/658, 25.xii.1967 (G.C.B.); Mount Marion, Wellington Range, *G. C. Bratt* 1526, (G.C.B.); Mount Wellington, *F. R. M. Wilson*, March 1891 (MEL

* (G.C.B.) in Herbarium of Dr. G. C. Bratt, West Moonah, Tasmania.

9378); Mount Wellington, Panorama Track, *G. C. Bratt* 513, 25.viii.1963 (G.C.B.); Thark Ridge, Wellington Range, *G. C. Bratt* 2864, 14.xi.1965 (G.C.B.); Trestle Mountain, Wellington Range, *G. C. Bratt* 67/66, 5.ix.1967 (G.C.B.).

TASMANIA (UV +)—Summit of Cradle Mountain, Cradle Mountain—Lake St. Clair National Park, *Rex Filson* 10757 & *Sue Filson*, 25.ii.1968 (MEL 1010911); Cradle Mountain, North-west, *G. C. Bratt* 3634, 17.xii.1966 (G.C.B.); Great Lake near Liawenee, *G. C. Bratt* 68/23, 27.i.1968 (MEL 27359); Mount Wellington, Summit Plateau, *G. C. Bratt* 1870, 20.xii.1964 (G.C.B.); Mount Montague, Wellington Range, *G. C. Bratt* 2973, 19.xii.1965 (G.C.B.).

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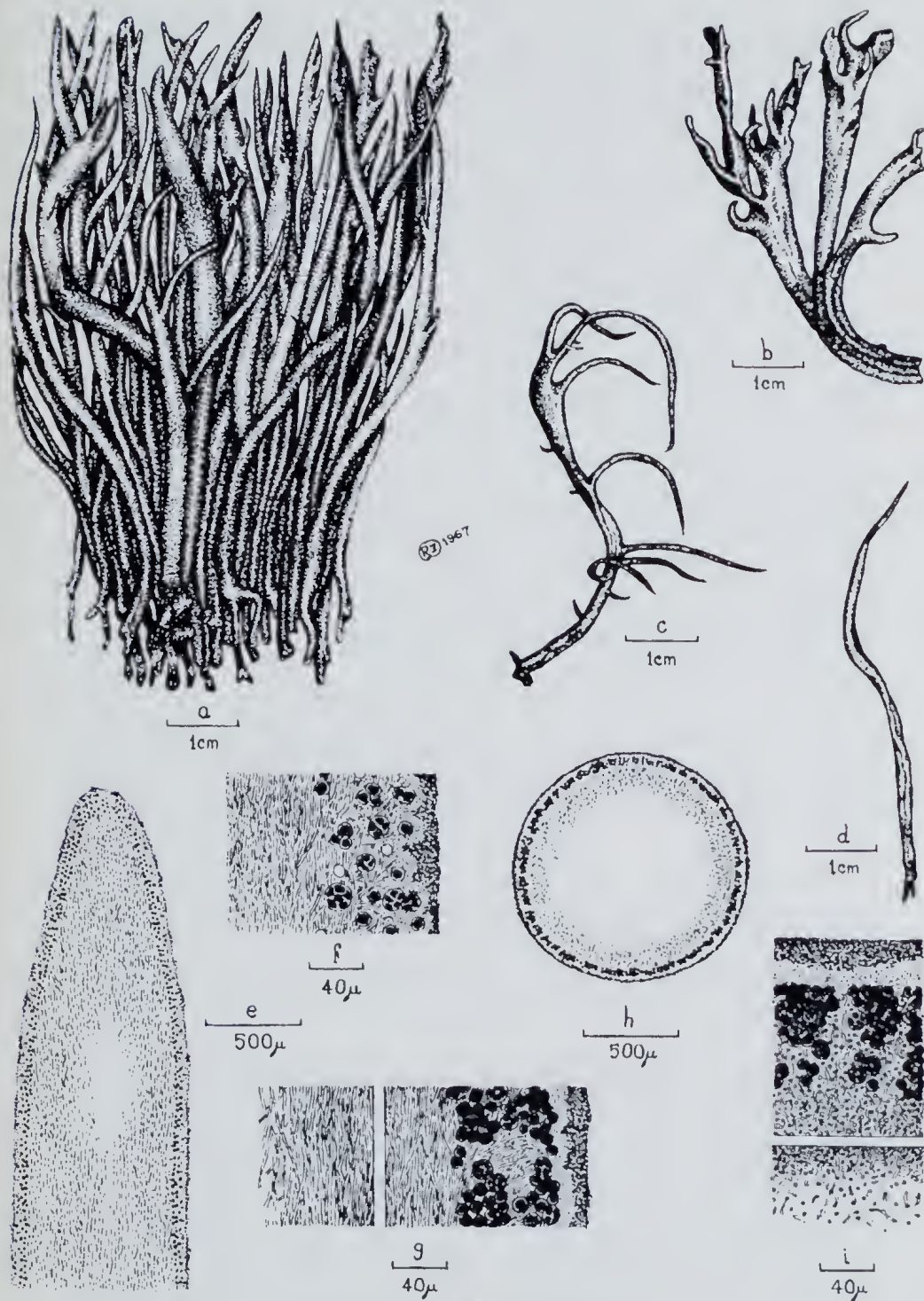
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PLATE 21

Thamnolia vermicularis (Sw.) Schaer.

- a. Typical clump of thalli from amongst *Poa* tussocks on the Bogong High Plains collected by A. C. Beauglehole (MEL 19474). (This clump illustrates the polymorphism of the individual strands showing both the simple tapering thalli and the large inflated forms.)
- b. A branched inflated thallus separated out from the same clump.
- c. A multiple branched mixture of fine tapering lobes and inflated thallus from the same clump.
- d. A single simple strand tapering upwards to a fine point separated out from the same clump.
- e. A longitudinal section through the tip of the thallus.
- f. Enlarged portion from the above section.
- g. Longitudinal section through the thallus, reduced in width.
- h. Cross section through the thallus.
- i. Enlargement of the cross-section, reduced in width.

PLATE 21



(For explanation see facing page)

PLATE 22

(Crystals produced by substances in the microcrystal test solutions).

- a. Thamnic acid recrystallized in $\text{Ba}(\text{OH})_2$ from the acetone extract of MEL 19474, *Thamnia vermicularis* UV-, collected on Basalt Hill, Bogong High Plains, Victoria. A. C. Beaglehole.
- b. Thamnic acid recrystallized in G.A.An. from the acetone extract of MEL 19691, *Thamnia vermicularis* UV-, collected at Charlot's Pass, Kosciuszko State Park, New South Wales. Rex Filson 7907. (These crystals form readily and were photographed after 35 minutes).
- c. Squamatic acid recrystallized in K_2CO_3 from the acetone extract of MEL 1010911, *Thamnia vermicularis* UV +, collected on the summit of Cradle Mountain, North-west Tasmania. Rex Filson 10757. (According to Thomson (1968) these crystals should form rapidly but in this instance development was very slow. The characteristic brown, branching, needle-shaped crystals were photographed after two and a half days).
- d. Squamatic acid recrystallized in G.E. from the acetone extract of MEL 1010911, *Thamnia vermicularis* UV +. (The thin boat-shaped plates form quickly and were photographed after 20 minutes).
- e. Baomycic acid recrystallized in G.A.Q. from the acetone extract of MEL 10067, *Thamnia vermicularis* UV +. University of Colorado Exsiccata No. 37. Colorado U.S.A. (Thomson says that these crystals should form after two or three hours, contrary to this our crystals formed almost immediately and were photographed after ten minutes. The crystals started as thin rhombic plates and soon grew to large elongated oblique-ended to round-ended clusters of plates).
- f. Baomycic acid recrystallized in G.A.An. from the acetone extract of MEL 1010911, *Thamnia vermicularis* UV +. (These crystals are extremely slow in recrystallizing, this photograph was taken after 24 hours).
- g. Squamatic acid and Baomycic acid recrystallized in G.A.Q. from the acetone extract of MEL 1010911, *Thamnia vermicularis* UV +. (These crystals formed fairly rapidly).
- h. Unknown crystals recrystallized in G.A.An. from the acetone extract of MEL 1010911, *Thamnia vermicularis* UV +. (These crystals formed overnight in both this specimen and in the specimen distributed in the University of Colorado Exsiccata No. 37, from Colorado U.S.A.).

$\text{Ba}(\text{OH})_2$ —a saturated solution of barium hydroxide in water.

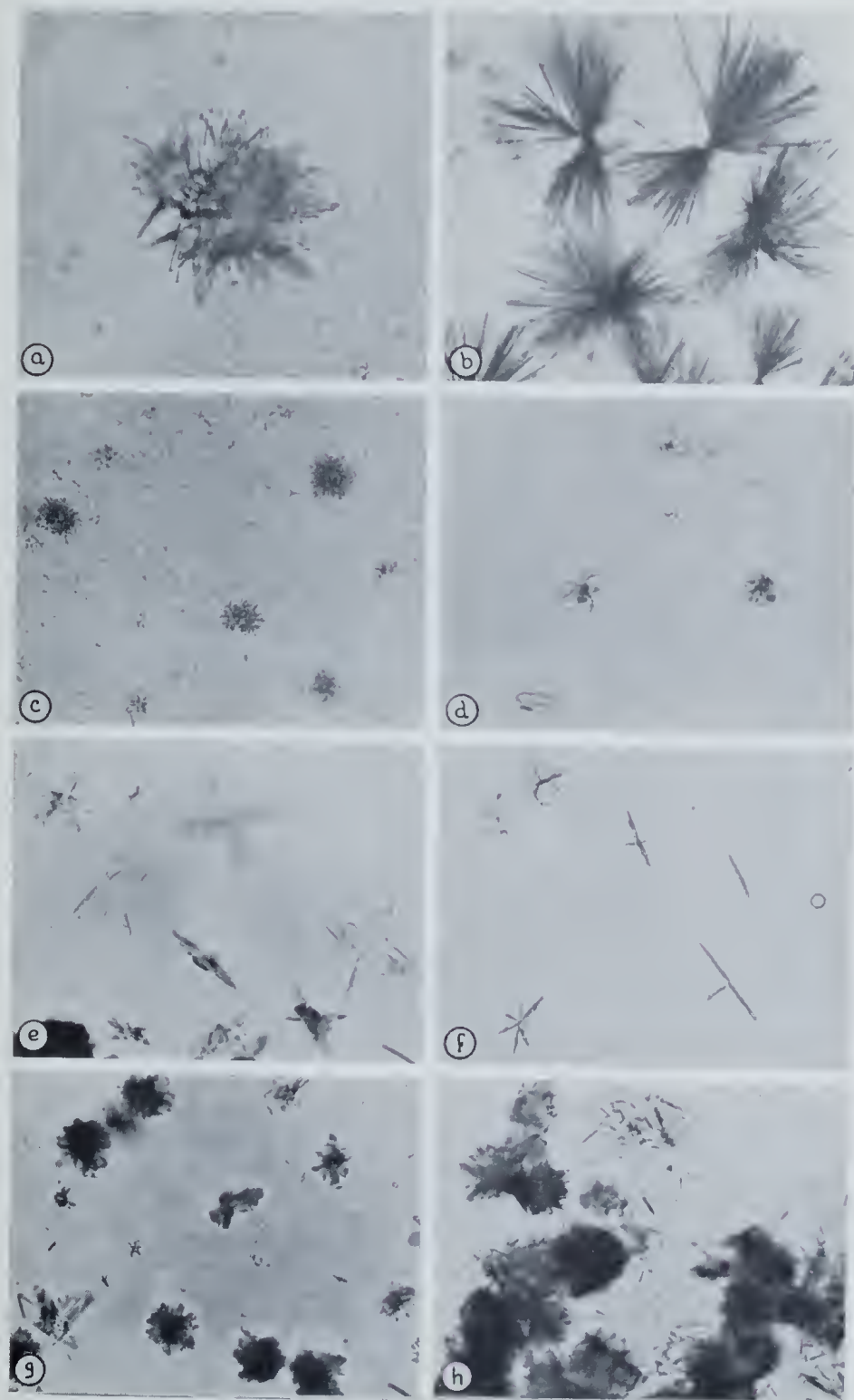
G.A.An.—Two parts glycerine, two parts alcohol, one part aniline.

G.A.Q.—Two parts glycerine, two parts alcohol, one part quinoline.

G.E.—One part glycerine, three parts glacial acetic acid.

K_2CO_3 —a 10% solution of potassium carbonate in water.

PLATE 22



(For explanation see facing page)

PRELIMINARY NOTICE ON THE SONDER COLLECTION IN THE NATIONAL HERBARIUM OF VICTORIA

by

A. B. COURT*

Almost the whole of the huge herbarium accumulated by O. W. Sonder (1812–81) lies in the general collections of the National Herbarium of Victoria, and its purchase by the Victorian Government towards the end of last century further enriched the excellent collections already acquired by Baron von Mueller. The history of its acquisition will be detailed by the author in another place and extensive notes on its contents will be published in due course. In the mean time, the following information is intended to provide a very brief guide to some of the more important elements that Sonder brought together over a period of nearly 50 years to form a collection that comprised about a quarter of a million sheets. This article also contains the first recent attestation concerning the whereabouts of the Sonder herbarium excluding the major part of his South African collection and other smaller segments and misleading assertions regarding the location of this famous herbarium are accordingly corrected.

1. *Scope.* Those regions explored principally by German botanists before about the eighth decade of last century are well represented (e.g., central Europe, South Africa, tropical South America and to a lesser extent Australia) but other regions are not so well covered. Sonder's collections embraced every major group of plants within both the cryptogams and phanerogams and contained thousands of autographic specimens from many well-known botanists.

2. *Specimens associated with Linné's Disciples.* Several hundred specimens belonging to this category have been located and most of them came from Thunberg but a few Ehrhart specimens (e.g., *Phytophylacium Ehrhartianum* and *Planta Cryptogamae Linnaea*) and about 100 Gisecke cryptogams have been noted. Two genuine Linnean specimens and one from his son have been located.

3. *Lehmann Collections.* Sonder acquired several thousand sheets from J. G. C. Lehmann including most of his *Boraginaceae* (about 800 sheets). Presumably most of the specimens associated with Linné's disciples came through Lehmann.

4. *South African Collections.* The most important components of Sonder's South African collection were acquired by Stockholm many years before Melbourne received most of the remainder which still form a very important collection.

5. *Tropical South America.* There is a strong association between Sonder's herbarium and Martius's *Flora brasiliensis* but the extent of this association is not yet fully understood. O. Berg used Sonder's *Myrtaceae* in his studies and important collectors well represented are K. Moritz, A. F. Regnell, C. F. P. Martius, F. Sellow and J. F. Widgren. The extent of the Brazilian material in Melbourne must be reckoned as substantial and should be taken into account for many studies on the flora of this and neighboring countries.

6. *Australia.* Sonder's collection of Australian plants is not as rich as those of some other regions and the two most important components are undoubtedly a good collection of L. Preiss specimens and numerous specimens transmitted to Sonder by Mueller. Most of the latter specimens returned to Melbourne when Sonder's collection was purchased.

7. *Central Europe.* Sonder's collection of central European material is extensive but it does not seem to be rich in autographic specimens.

8. *Algae.* Possibly the *Algae* formed the most important component of Sonder's collection and certainly Melbourne's holdings are extensive. Numerous autographic specimens from many well-known algologists are represented, e.g., C. A. Agardh, W. H. Harvey and Sonder himself. A comprehensive examination of the *Algae* by anyone without an extensive knowledge of the group would be imprudent at this stage because of the manner in which the material has been preserved.

9. *Ericaceae.* Evidently Sonder had resolved during the latter years of his life to study *Ericaceae* and acquired substantial collections (ca. 2,500 sheets) for examination. Amongst the most important of these were some J. C. Wendland and Thunberg types and many specimens annotated by J. C. Klotsch.

* National Herbarium of Victoria.

